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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/582,982	07/10/2000	KATSUNORI ITOU	49657-742	4615

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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 09/12/2002

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/582,982

Applicant(s)

ITOU ET AL.

Examiner

Harry D Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takata et al (US 4,642,219) in view of Ochi et al (US 5,705,124) and Applicant's admission of prior art, and further in view of "High Carbon Chromium Bearing Steels".

Takata et al teach (see abstract) a bearing steel which contains, by weight, 0.7 to 1.1% C, 0.15 to 1.6% Si, 0.15 to 1.15% Mn, less than 0.010% P, less than 0.002% S, 0.5 to 1.6% Cr, less than 0.015% Al, less than 0.0015% Ti, less than 0.0006% O, less than 0.005% N and the balance iron.

Takata et al do not teach that the bearing steel contains 0.53 to 3.0% Ni.

Ochi et al teaches a bearing steel that is similar in composition to the bearing steel of Takata et al. Ochi et al teach (see col 5, lines 14-23) that Ni can be added at 0.1 to 2.0% to bearing steels for the purpose of improving the hardenability and extending the life of the bearing steel.

Therefore, it would have been obvious to one of ordinary skill in the art to have added Ni as taught by Ochi et al to the bearing steel of Takata et al because Ochi et al teach that Ni improves hardenability and extends the life of bearing steels.

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The claim is directed to a "part" of an antifriction bearing having an inner ring, an outer ring and a rolling element. Takata et al in view of Ochi et al do not expressly teach that the steel is used as a part of an antifriction bearing, however, the bearing steel of Takata et al in view of Ochi et al would have been expected by one of ordinary skill in the art to have antifriction properties and, thus, be made into an antifriction bearing.

Takata et al teach (see col 5, lines 3-9) that the bearing steel is quench hardened and then tempered at 170°C. Thus, Takata et al do not teach that the bearing is tempered at 180 to 350°C.

However, Applicant admits as prior art (see page 2, lines 7-12) that it was well known in the art to perform a high temperature tempering (300°C) on high temperature use bearing steels that have been quench hardened, such as SUJ2 or the like, or carbonitrided, such as SCM 420 or SNCM 815, in order to attain dimensional stability.

"High Carbon Chromium Bearing Steels" at page 1, in Table 2, describes the standard Japanese steel "SUJ2". SUJ2 steel has a composition that is very similar to the composition disclosed by Takata et al. Thus, one of ordinary skill in the art would have expected the bearing steel of Takata et al to have properties similar to SUJ2 steel.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the bearing steel of Takata et al in a high-temperature bearing because the similar steel SUJ2 had been known to be used in high-temperature bearings and SUJ2 steel and the steel of Takata et al have similar properties.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the conventional processing step of high-temperature tempering after quench hardening or carbonitriding to the bearing steel of Takata et al in view of Ochi et al because the high-temperature tempering aids the bearing in dimensional stability.

The claim states "having a structure subjected to tempering after quench hardening or carbonitriding, wherein the hardness after said tempering is at least HRC 58 when tempered at a temperature in a range of 180°C to 350°C and the maximum carbide size is not more than 8 μm ". Takata et al teach (see Table 2) that the non-metallic inclusions (i.e.-oxides, nitrides, carbides) have average length of 1.0 μm for the inventive examples. With respect to the property of hardness, the alloy composition taught by Takata et al in view of Ochi et al overlaps the alloy composition recited in the claims and the processing method of Takata et al in view of Applicant's admission of prior art and "High Carbon Chromium Bearing Steels" is identical to the process recited in the claims, and, therefore, one of ordinary skill in the art would have expected that the products taught by the references would have the same hardness as claimed.

Regarding claim 2, Takata et al teach (see abstract) optionally adding 0.05 to 0.50% Mo and 0.05 to 0.30% V.

Response to Arguments

3. Applicant's arguments filed 21 August 2002 have been fully considered but they are not persuasive. Applicant has argued that:

- a. None of the applied references relates to bearing steels designed for high temperature service;

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- b. SUJ2 steel is not similar to the steel disclosed by Takata et al;
- c. There is no motivation to achieve a high temperature service bearing;
- d. Takata et al teaches away from adding Ni;
- e. Unexpected and dramatically superior results are achieved by the addition of Ni;
- f. The rejection under 35 USC 103 erroneously relies upon inherency;
- g. The problem addressed by Applicants is different than the problem addressed by the prior art; and,
- h. The reference to Habrovec et al in the rejection is procedurally erroneous under due process of law.

In response to Applicant's first argument, though none of the applied references teach use at high temperatures, Applicant admits as prior art that SUJ2 steel had been used for high temperature service when treated with a high temperature tempering process.

In response to Applicant's second argument, the content of Ni, as argued by Applicant, in the steel of Takata et al, is merely an impurity. Similarly, the content of Cu, which is not mention elsewhere in Takata et al, is the amount present as an impurity. Takata et al teaches (see col 3, line 67 to col 4, line 4) that Al is disadvantageous and should be kept to a minimum, i.e.-the minimum amount possibly without intentional addition. Therefore, the amounts of the impurities, Cu, Ni and Al, do not materially affect the properties of the composition. The affect of Ni on the composition is taught by Ochi et al (see col 5, lines 14-23).

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In response to Applicant's third argument, the motivation to achieve the high temperature service bearing comes from Applicant's admission of prior art which states that SUJ2 steel had been used for high temperature service. SUJ2 steel and the steel of Takata et al in view of Ochi et al have very similar compositions, overlapping for every element except for the amount of Ni present as taught by Ochi et al. One of ordinary skill in the art would have had a reasonable expectation of successfully implementing the steel of Takata et al in view of Ochi et al as a high temperature bearing because of the similarities in composition, and thus properties, between the SUJ2 steel and the steel of Takata et al in view of Ochi et al.

In response to Applicant's fourth argument, though Ni is present only as an impurity, Takata et al do not expressly teach that Ni should not be added. In comparison, Takata et al teach that Al, O and N, which are present as impurities, must be kept below a certain level to attain the desired properties. There is no similar statement regarding Ni, therefore, Takata et al teach that whatever amount of Ni is present is acceptable. In view of the teaching of Ochi et al, where it is taught that Ni is added at 0.1-3.0 wt% to add hardenability and bearing life, it would have been obvious to one of ordinary skill in the art to have added Ni as taught by Ochi et al to the bearing steel of Takata et al.

In response to Applicant's fifth argument, any addition of Ni which provides the results of increased bearing life cannot be unexpected. Ochi et al expressly teaches that Ni provides an increased bearing life. Therefore, one of ordinary skill in the art

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would have expected the bearing life to increase when Ni was added, i.e.-such a result cannot be considered unexpected.

In response to Applicant's sixth argument, it has been held in the past that "inherency is not improper per se under 35 USC 103". See *In re Pearson* 181 USPQ 641 (1974); *In re Kalm* 154 USPQ 10, 12 (1967). The prior art suggests doing what Applicant's have done, therefore, one of ordinary skill in the art would have expected the final high temperature bearing to have the properties as claimed. Takata et al teach that the inclusions are kept below 1 μm in size. Ochi et al teach that Ni improves hardenability, thus, one of ordinary skill in the art would have expected the bearing to have a higher hardness after tempering.

In response to Applicant's seventh argument, the problem addressed by the prior art is finding a means of increasing the bearing life of bearing steel (see Takata et al, last sentence of abstract and Ochi et al, title).

In response to Applicant's eighth argument, Habrovec et al is not actually relied upon in the rejection. Habrovec et al is cited to provide a factual basis for the Examiner's assertion that the bearing steel of Takata et al in view of Ochi et al has antifriction properties, i.e.-merely providing in writing, a fact that one of ordinary skill in the art knows to be true, that bearing steels have antifriction properties.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Habrovec et al (US 3,859,146) teach a steel composition for anti-friction bearings. Habrovec et al teach (see col 1, lines 13-17) that anti-friction

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bearings are generally made from an overeutectoid chromium steel. The composition is within the limits of the SUJ2 standard steel. Therefore, one of ordinary skill in the art would have expected the steel of Takata et al in view of Ochi et al to possess antifriction properties.

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 6:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for

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the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
September 11, 2002


ROY KING
SUPERVISORY PATENT EXAMINER
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